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| 10/080,890      | 02/22/2002  | Huitao Luo           | 10017759-1          | 9393             |

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HEWLETT-PACKARD COMPANY  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, CO 80527-2400

EXAMINER

HUNG, YUBIN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2625

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/080,890

Applicant(s)

LUO, HUITAO

Examiner

Yubin Hung

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Response to Amendment/Arguments***

1. This action is in response to amendment filed 05/06/2005, which has been entered.
2. Claims 1-22 are still pending.
3. In view of Applicant's amendment, the objection to the specification has been withdrawn.
4. In view of Applicant's amendment, the 35 USC § 112 rejection has been withdrawn.
5. In view of Applicant's amendment, the 35 USC § 103 rejections of claims 11-22 have been withdrawn.
6. Regarding Applicant's request that an affidavit supporting the rejection of claim 5 based on official notice (page 15 of the response filed 05/06/2005 regarding claim 5, especially the 1<sup>st</sup> paragraph; also page 16, last paragraph, lines 8-10), Applicant's attention is directed to pp. 191-192 of *Digital Image Processing*, 1<sup>st</sup> ed. (1993) by Gonzalez and Woods.

7. Applicant's arguments filed 05/06/2005 have been fully considered but they are not persuasive; see below.

**8. In remarks Applicant argued in substance:**

8.1 (regarding claim 1) *that none of the cited references mention or provide a solution for addressing halo effect. (Page 10, 3<sup>rd</sup> paragraph through page 11, 1<sup>st</sup> paragraph.)*

However, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., solving the halo effect problem) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regardless, Moroney does consider the halo effect [page 109, right column, last paragraph]. Furthermore, Moroney discloses generating mask by low-pass filtering *monochrome (i.e., grey-scale)* image [page 108, right column, last paragraph].

8.2 (regarding claim 1) *that Bloomer does not discuss producing an image mask, performing low pass filtering under control of segmentation, or operations using*

*grey-scale components (page 11, 2<sup>nd</sup> paragraph); that Kikuchi does not suggest using morphological functions, nor non-linear image mask development using grey-scale component low-pass filtering (page 11, last paragraph, lines 5-7 and page 12, 2<sup>nd</sup> paragraph, lines 3-5; see also page 13, 1<sup>st</sup> paragraph, lines 7-13)*

However, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Regardless, Bloomberg does disclose applying morphological operations on *grey-scale* image [column 2, lines 11-15].

8.3 (regarding claim 1) *that claim 1 is not obvious in view of Moroney and Kikuchi (page 12, 3<sup>rd</sup> paragraph, last 3 lines)*

However, Claim 1 was rejected over Moroney and in view of *Bloomberg et al.* and Kikuchi et al.

8.4 (regarding claim 1) *that the motivation to combine is alleged to be "because...filtering operation" (page 13, 1<sup>st</sup> paragraph, lines 1-4) and that "because ...image filtering" (page 13, 2<sup>nd</sup> paragraph, lines 5-6)*

However, the Office action passages recited above is directed to what one of ordinary skill in the art is motivated to do and the combinability of the references, not the motivation *per se*.

8.5 (regarding claim 1) *that none of the three there is no reason to combine (page 13, 1<sup>st</sup> paragraph, lines 7-13 and 2<sup>nd</sup> paragraph, lines 9-16) and that the rejection of claim 1 uses hindsight (page 14, 2<sup>nd</sup> paragraph, lines 1-4)*

However, In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the Office action mailed 02/03/2005 does provide sound reasons for combining the references to obtain the invention as specified in claim 1. [See page 4, 2<sup>nd</sup> paragraph, lines 4-7].

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized

that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Amended claims 11-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, amended claim 11, and similarly amended claim 18, is ambiguous as a result of its adding the new limitation "*and the chromatic component*" in the last line. The last two lines, reading together, can mean either (1) that said image mask is calculated from the gray-scale component *and* the chromatic component, or (2) that the enhancement of said gray-scale component is done by utilizing the mask and the chromatic component. **[Note: For examination purpose, (2) is assumed. (1) will involve new matter (namely also using chromatic component for mask calculation). Consider deleting "calculated from the gray-scale component" from the last line since it is clear from the claim that it is the case.]**



***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moroney ("Local Color Correction Using Non-Linear Masking," *2000 IS&T/SID 8<sup>th</sup> Color Imaging Conference*, pp. 108-111), in view of Bloomberg et al. (US 5,619,592) and Kikuchi et al. (US 6,064,776).

12. Regarding claim 1, Moroney discloses

- low-pass filtering said gray-scale component to produce an image mask and enhancing tone reproduction of said digital image utilizing at least said image mask [Fig. 1, blocks labeled "F(i)", "Mask Image" (mask generation using low-pass filtering) and "G(i,m)" (enhancing); PP. 108-109: Section "Basic Algorithm"]

Moroney does not expressly disclose

- morphologically filtering said grayscale component to produce a segmentation result
- that low-pass filtering said gray-scale component to produce an image mask is under control of at least said segmentation result

However, Bloomberg teaches applying morphological operations (including opening, closing, erosion and dilation) to obtain segment data [Col. 18, lines 27-31] and Kikuchi teaches filtering under the control of a segmentation result [Fig. 22; Col. 18, lines 5-30].

Moroney, Bloomberg and Kikuchi are combinable because they all have aspects that are from the field of endeavor of image filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Moroney with the teaching of Bloomberg and Kikuchi by morphologically filtering an image to obtain segmentation result and then using the segmentation result to control a subsequent filtering operation. The motivation would have been to be able to adaptively filter pixels of an image, depending on the segment it belongs to, in order to obtain a better result, since the image characteristics can vary from segment (or block) to segment, as pointed out by Kikuchi in Col. 18, lines 20-22.

Therefore, it would have been obvious to combine Bloomberg and Kikuchi with Moroney to obtain the invention as specified in claim 1.

13. Regarding claim 5, **official notice** is taken that in digital image processing low-pass filtering by definition operates on an area of pixels defined by its kernel.

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14. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moroney ("Local Color Correction Using Non-Linear Masking," *2000 IS&T/SID 8<sup>th</sup> Color Imaging Conference*, pp. 108-111), Bloomberg et al. (US 5,619,592) and Kikuchi et al.

Art Unit: 2625

(US 6,064,776) as applied to claims 1 and 5 above, and further in view of Lee et al. (US 5,978,497).

15. Regarding claim 2, the combined invention of Moroney, Bloomberg and Kikuchi teaches all limitations of its parent, claim 1.

The combined invention of Moroney, Bloomberg and Kikuchi does not expressly disclose

- quantizing said grayscale component before morphologically filtering said grayscale component

However, Lee teaches quantizing a grayscale image before morphologically filtering it. [Fig. 3A, refs. 35-39; Col. 9, lines 30-32; Col. 10, lines 6-11. Note that binarization is a type of quantization.]

The combined invention of Moroney, Bloomberg and Kikuchi is combinable with Lee because they have aspects that are from the same field of endeavor of image enhancement.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Moroney, Bloomberg and Kikuchi with the teaching of Lee by quantizing a grayscale image before morphologically filtering it. The motivation would have been to further separate connected components, as Lee indicates in Col. 10, lines 3-11.

Therefore, it would have been obvious to combine Lee with Moroney, Bloomberg and Kikuchi to obtain the invention as specified in claim 2.

16. Regarding claim 3, Lee further discloses

- decomposing said grayscale component into a plurality of binary images [Fig. 3A, refs. 35-39; Col. 9, lines 30-32]

17. Regarding claim 4, and similarly claims 13, Lee further discloses

- said morphologically filtering said grayscale component comprises morphologically filtering each of plurality of binary images [Fig. 3A, refs. 35-39; Col. 9, lines 30-32; Col. 10, lines 3-36. Note that while Lee has not expressly disclosed that the low threshold binary image (mask) is also morphologically filtered, it would have been obvious to one of ordinary skill in the art to also apply such an operation, as is done to the other two binary images. The motivation would have been to use algorithms (for morphological filtering) that have already been developed (and most likely coded) to remove small connected components, as carefully selected erosion and dilation operations are known to be able to accomplish.]

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18. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moroney ("Local Color Correction Using Non-Linear Masking," *2000 IS&T/SID 8<sup>th</sup> Color Imaging Conference*, pp. 108-111), Bloomberg et al. (US 5,619,592) and Kikuchi et al. (US 6,064,776) as applied to claims 1 and 5 above, and further in view of Doerfel (US 6,085,152).

19. Regarding claims 6-8, the combined invention of Moroney, Bloomberg and Kikuchi teaches all limitations of its parent, claim 5.

The combined invention of Moroney, Bloomberg and Kikuchi does not expressly disclose that said low-pass filtering is operable to

- (claim 6) calculate a first average value over a peer group, wherein said peer group is each pixel within said filter kernel that possess a same segmentation value as a selected pixel
- (claim 7) calculate a second average value over a non-peer group, wherein said non-peer group is each pixel within said filter kernel that does not possess the same segmentation value as the selected pixel

and that

- (claim 8) said image mask is a matrix of values with each value being a function of at least said first average value and said second average value

However, Doerfel teaches computing the average value of pixels belong to an object (the peer group) and the average value of the background pixels (the non-peer group) in a region surrounding the object in order to determine their contrast, which in turn determines the visibility of the pixels in the object. [Fig. 3; Col. 5, lines 34-42. Note that the region surrounding the object is considered to correspond to a filter kernel area. Note further that the visibility determination results in a binary mask.]

The combined invention of Moroney, Bloomberg and Kikuchi is combinable with Doerfel because they have aspects that are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Moroney, Bloomberg and Kikuchi with the teaching of Doerfel by computing the average value of pixels belong to an object (the peer group)

Art Unit: 2625

and the average value of the background pixels (the non-peer group) in a region surrounding the object. The motivation would have been to determine the contrast between an object and its surrounding and to use the information for further decision making such as the determination of the visibility of objects, as Doerfel indicates in Col. 2, lines 11-14.

Therefore, it would have been obvious to combine Doerfel with Moroney, Bloomberg and Kikuchi to obtain the inventions as specified in claims 6-8.

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20. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moroney ("Local Color Correction Using Non-Linear Masking," *2000 IS&T/SID 8<sup>th</sup> Color Imaging Conference*, pp. 108-111), Bloomberg et al. (US 5,619,592) and Kikuchi et al. (US 6,064,776) as applied to claims 1 and 5 above, and further in view of Masataka (JP 2000-310987, with English Abstract).

21. Regarding claims 9 and 10, the combined invention of Moroney, Bloomberg and Kikuchi teaches all limitations of their parent, claim 1.

The combined invention of Moroney, Bloomberg and Kikuchi does not expressly disclose

- (claim 9) applying a seed value that is operable to affect a global modification of tone reproduction
- (claim 10) said seed value is selected by a region of interest algorithm

However, Masataka teaches applying a seed value that is operable to affect a global modification of tone reproduction and wherein the seed value is selected by a region-of-interest algorithm. [Abstract; Fig. 1, refs. 3-5. Note that  $W_1$  is a region of interest,  $P_{r1}$  is its corresponding seed value and 51a is the result of tone modification (to the image 1a) with respect to the seed value  $P_{r1}$ .]

The combined invention of Moroney, Bloomberg and Kikuchi is combinable with Masataka because they have aspects that are from the same field of endeavor of image filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Moroney, Bloomberg and Kikuchi with the teaching of Masataka by applying a seed value that is operable to affect a global modification of tone reproduction and wherein the seed value is selected by a region-of-interest algorithm. The motivation would have been to automatically conduct a pixel value converting process that normally requires cumbersome operations, as Masataka indicates in "Problem to be solved" part of the abstract.

Therefore, it would have been obvious to combine Masataka with Moroney, Bloomberg and Kikuchi to obtain the inventions as specified in claims 9-10.

***Allowable Subject Matter***

22. Claims 11 and 18 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. Their respective dependent claims 12-17 and 19-22 would also be allowable because of dependency.

23. The following is a statement of reasons for the indication of allowable subject matter:

23.1 Regarding claim 18, and similarly claim 11, closest art of record Moroney ("Local Color Correction Using Non-Linear Masking," *2000 IS&T/SID 8<sup>th</sup> Color Imaging Conference*, pp. 108-111), Bloomberg et al. (US 5,619,592) and Kikuchi et al. (US 6,064,776) in combination disclose all of its limitations (per the analysis of claim 1) except the following

- Enhancing tone production of **gray-scale** component utilizing at least said image mask and the chromatic component

Additionally, Daly (US 5,987,169) creates a mask from the luminance component but only applies it to the color components [Fig. 5].



***Conclusion and Contact Information***

25. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung  
Patent Examiner  
August 10, 2005

A handwritten signature in black ink, appearing to read 'Sanjiv Shah', with a stylized flourish at the end.

**SANJIV SHAH  
PRIMARY EXAMINER**